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ABSTRACT

This paper describes a model for the use of the Web to engage communities in better understanding and appreciation of cultures through partnership among a knowledge organization, K-12 teachers and learners, museums, and regional and virtual communities. Museums and other content providers offer artifacts for object-based learning. Content specialists contribute specialized content expertise and evaluate resources. Education specialists develop, evaluate, and use materials for instruction. Information specialists identify, evaluate, organize, and promote the use of web-based and other information resources. They also develop tools to capture and display content, to engage the teachers and learners in dialogue, and to reach out and extend the content and resources to both local and virtual communities. Communication tools enable members of the local as well as virtual communities to provide reflections and engage in dialogue, as well as to contribute their own content. Two recent projects developed from the model are described, in addition to four previous projects developed by the project team, that exemplify earlier applications of the model. Lessons learned from the project work are identified, and the paper discusses ways in which this type of project work reflects new roles for the professionals participating in the projects, as well as changes in the mission of their organizations and professions. (Contains 19 references.) (Author)

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PAPERS
Museums and the Web 2001

Engaging Museums, Content Specialists, Educators, And Information Specialists: A Model And Examples

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Abstract

This paper describes a model for the use of the Web to engage communities in better understanding and appreciation of cultures through partnership among a knowledge organization, K-12 teachers and learners, museums, and regional and virtual communities. Museums and other content providers offer artefacts for object-based learning. Content specialists contribute specialized content expertise and evaluate resources. Education specialists develop, evaluate, and use materials for instruction. Information specialists identify, evaluate, organize, and promote the use of web-based and other information resources. They also develop tools to capture and display content, to engage the teachers and learners in dialogue, and to reach out and extend the content and resources to both local and virtual communities. Communication tools enable members of the local as well as virtual communities to provide reflections and engage in dialogue, as well as to contribute their own content. Two recent projects developed from the model are described, in addition to four previous projects developed by the project team, that exemplify earlier applications of the model. Lessons learned from the project work are identified, and the paper discusses ways in which this type of project work reflects new roles for the professionals participating in the projects, as well as changes in the mission of their organizations and professions.

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Introduction

Successful partnerships among different institutions or disciplines are an attractive way of providing complementary expertise in addressing needs of common concern and tasks that require a range of knowledge areas. As professions evolve in their missions and their roles expand and intersect with those of other disciplines, the potential for effective synergistic partnerships increases. Professionals in museums, libraries, the performing arts, and K-12 education have all undergone profound misson changes which have resulted in greater emphasis on outreach and new connections with members of other professional communities. At the University of Michigan, some interesting and fruitful partnerships have engaged members of the arts community, museum and library specialists, faculty scholars, K-12 educators, and students from the School of Information. From these has emerged a partnership model utilizing the information and technology skills of librarians and information professionals, the content knowledge of curators and scholars, and the expertise of K-12 teachers and other youth educators. The partnerships developed have broadened the reach of arts and cultural heritage content by taking advantage of the unique potential of

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information technology to disseminate content, knowledge and ideas to a wide array of audiences, to provide context to increase the understanding of cultural content, and to provide a means of interactive and cross-cultural exchange of ideas and new creative work.

This paper describes partnerships in two recent projects which build on the model, as well as lessons learned in these and related projects which exemplify earlier applications of the model. Finally, some observations are offered on the ways in which this type of project work offers the opportunity for professionals to assume some of the new roles which are emerging as a result of the evolving missions of their organizations.

The Projects

The two projects which illustrate the partnership model described in this paper are ones in which a faculty member and graduate students at the University of Michigan School of Information play organizing roles as part of the CHICO project (Cultural Heritage Initiative for Community Outreach (http://www.si.umich.edu/CHICO/). CHICO has as its mission to broaden the reach of cultural heritage resources through the innovative use of information technology and through partnerships with museums, schools, libraries, content specialists, and community arts programs. CHICO collaborated with campus partners to provide a digital showcase for events and exhibits in the arts. The resources were augmented with contextual enrichment provided by content specialists. The site was targeted to general audiences, with a focus on K-12 users. Delivery included both Web-based resources as well as public events and activities in the classroom with the partnership of K-12 educators.

Royal Shakespeare Company Project (RSC) http://www.si.umich.edu/chico/rsc/

A landmark performance event at the University of Michigan is the appearance in March 2001 of The Royal Shakespeare Company from London for a three-week residency on campus and in the surrounding region. The Company's performance of the complete cycle of Shakespeare's eight historical plays and the residency of the actors, stage crew, and education department engage University scholars and students, regional community groups , K-12 schools, theaters, and local museums and libraries. Educational and outreach activities developed for the event help K-12 teachers and learners learn not only about the plays themselves, but also about the relevance the themes in the plays have in their everyday lives. School of Information graduate students in the CHICO project have a role in developing web resources to help increase appreciation and understanding of the plays.

Food/Animals in Ancient Cultures Project http://www.si.umich.edu/CHICO/AncientFood/ http://www.si.umich.edu/CHICO/Animals/

A University of Michigan professor who has done pioneering work in providing a multidisciplinary approach to the study of classics and archaeology worked with CHICO students to develop a web resource to help K-12 students understand the role of food in ancient culture through examination of artefacts in a local museum. SI graduate students had a role in developing resources and tools to build a virtual and local

community of scholars, K-12 teachers and learners, museum experts, and other interested people in the community with the goal of understanding how people lived in ancient cultures and how these cultures have relevance in today's times.

Collaboration roles

With a collaboration among museums, content specialists, K-12 and outreach educators, and information specialists, there are roles for partners providing service to the end-user, as well as roles for end-users engaging with the content. Individual partners can play different roles according to their degree of expertise, level of commitment, and ability to participate in terms of time and resources. For us, the role distribution was as follows:

Content provision

- creation of content (curators, scholars, information specialists)
- resource discovery of information on related topics (information specialists)
- interpretation of content (curators, scholars, information specialists)

Content organization and distribution

- selection and organization of content (information specialists)
- mounting and display of content in digital form (information specialists)
- provision of contextual information and background for learning purposes (information specialists, curators, scholars)
- site design and implementation (information specialists)

Organization of project activities

- liaison (information specialists)
- identification of relevant content specialists (information specialists)
- recruitment of content specialists and partners (information specialists)

Activity creation

- providing web-based activities to engage in and connect with the content (information specialists)
- providing on-site activities which link to the physical and virtual exhibits (museums, performing arts agency)
- coordinating activities among the various partners (information specialists)

Audience

For the end-users and audiences, roles include:

- engagement with peer learners
- creation of artefacts and content which build upon the collection
- feedback on the usability and usefulness of the site

Engagement with Content Specialists

In creating web-based materials for both projects, the team's goals were to create interest in and understanding of the topic; augment the performance or museum visit experience; provide a means for further study of the topic; provide mechanisms to engage in dialogue; and provide a means for participatory experiences.

The broad themes for structuring the sites included Relevance and Connections; Context and History Background; and Behind the Scenes (stagecraft, or mounting a museum exhibit). In both projects, CHICO team members were able to take advantage of local content specialists, as well as resources and events, all which contributee to content of the web-sites and built upon the broad themes.

Content specialists in the Royal Shakespeare Company project

The visit of the Royal Shakespeare Company, organized by the University Musical Society, provided a ready-made infrastructure, including a collocation of content specialists and a wide array of planned educational outreach activities, including public lectures, museum exhibits, seminars, university class sessions open to the public, interviews, workshops, and in-school visits. The audiences for the events include the general public, university students, K-12 teachers and learners, and theater groups throughout the area of Southeast Michigan and central Canada.

In designing the site to establish relevance and connection, the CHICO students envisioned a resource containing information, enriched by images, maps, and links, to make clear the relevance of these plays to a contemporary audience. The site would also contain material to encourage people to make their own connections to the plays. An example is showcasing adaptations of Shakespeare's plays that have been set in modern times yet maintain the integrity of the text while framing the play in a contemporary setting. The site would also provide context and history background for the plays themselves, as well as provide information, images and links to elucidate the history in the plays; for example, a historical timeline and comparisons with instances of civil strife in the United States. Behind the scenes information would provide background on the art of the play in general, and specific information about the art of staging these plays in particular.

The CHICO student team members were interested in including content about the political climate of the time when the plays were written and showing how that related to the histories portrayed in plays to be staged in Ann Arbor by the RSC. The team first attempted to do their own research and compile materials from generalist sources to be presented from a generalist's perspective. Upon encouragement, they looked for expert help and were successful in recruiting assistance from specialists to write key pieces. A widely-renowned English professor involved in the RSC residency program will be giving a series of public lectures and agreed to contribute content on the play's historical and literary significance. This professor had just spent a week in England sitting in on rehearsals of the plays and talking with the plays' director. A doctoral student in theater, who coordinates the Shakespeare reading group on campus, also agreed to contribute. The content specialists were also asked to write short essays about Shakespeare's life, the history plays,

and the relevance of the history plays for a contemporary audience.

The Royal Shakespeare Company submitted images of costume designs and other materials; included was a file of photographs depicting rehearsal shots and images of historical engravings. The students were also successful in garnering permission to include ten essays requisitioned by the University Musical Society for the event. In conjunction with the project, the Curator of Special Collections at the Graduate Library prepared an exhibit on costumes used in Shakespearean plays, to be on display before and during the time that the RSC is in residence. The exhibit contains costumes, prints, photographs, rare books and drawings illustrating the clothing crafted for performances of Shakespeare's historical dramas from the mid-18th century to the present. With the assistance of the curator, CHICO team members selected and photographed materials from the exhibit to include on the website. The Curator also gave the students guidance on how to do research for other background content on the project. In addition to providing their own original content, the content specialists reviewed content developed by the students and evaluated parts of the website to make sure the historical content of the website is accurate.

Content specialists in the Ancient Food/Animals project

Through a university committee assignment, the CHICO director made the acquaintance of a faculty colleague in archaeology and classical studies, and the two exchanged information about their work. The classics professor was teaching an undergraduate class in Classical Civilizations called "Food in the Ancient World: Subsistence and Symbol." The students were planning to use themes from the class to create an exhibit at the archaeological museum on campus. The undergraduate students selected artefacts and photographs from the museum, created display labels, and helped do research for a website that would showcase the new exhibit.

A partnership was quickly begun, and CHICO team members were recruited to work with the professor and her class to help them with the design and creation of a website to be targeted to K-12 teachers and learners. The professor continues to get inquiries from visitors to an earlier site on the topic created for a similar class four years ago, and still receives frequent e-mail from K-12 students and teachers asking for more information: "Are more reading materials available?" "Are there recipes?" "And did they really eat peacock?" The professor responds when she has time, but is not always able to keep up with the demand for further information. She felt the interest was clearly there for an enhancement of the existing foods web site as well as the creation of a new site on animals in the ancient world. The new site would continue the theme of Food in the Ancient World but would focus on animals: in hunting, as food, as symbol and myth, as pets, and in relationships with humans, with K-12 as the primary audience.

For the professor, time was an issue, since she was involved in supervising the museum study for her undergraduate students and developing signage for the exhibit. She felt it would be helpful if team members could work independently or in tandem with the undergraduates. At the same time, the team members wanted to work closely with the professor and her students in creating the content material. They believed it would be difficult, and even counterproductive, to create the content for the website in isolation from the structure and

design that the site would have. Therefore, it was agreed that the team members would visit the class and spend time observing the professor and her students

For the Context and History part of the exhibit, CHICO team members gained insight into the background of the content from the professor and were provided with readings. In turn, CHICO gave presentations to the professor's class about signage and labels for the exhibit artefacts, and also shared information from the Education Curator at the UM Art Museum about signage practices at that museum. A local radio station provided digital versions of an interview with the professor conducted at the opening of the Animals exhibit of the interview (in .WAV and RealAudio format) to be mounted on the Web site.

CHICO team members added new features to the existing Ancient Foods site and updated the revised site to include both a regular HTML version and a version in Shockwave format, with a link provided for viewers to download Shockwave if needed. A Web site was created to accompany the Animals exhibit that opened at the end of the term and would run for several more months. The Museum had just acquired a touch-screen kiosk for the 'in gallery' activities, and the team members created a related resource for the kiosk, preparing a Director movie to use at the Museum's kiosk based on the revised Foods site. A day was planned for families to visit the museum, and this would be an opportunity to advertise the project.

For the Behind the Scenes component, team members photographed the undergraduate students and some of the exhibit installation and exhibit-building process. Students also met with the Associate Curator of Slides and Photos at the Museum and were given background on the animal exhibit. This will be included in a part of the site devoted to "Building an Exhibit" and will provide a behind-the-scenes look at exhibition design and creation.

To incorporate a Relevance and Connections dimension for the site, CHICO worked closely with a sixth grade teacher and her class, as described below.

Engagement with K-12 Audiences

Ancient Foods/Animals Project

One of the CHICO team members was enrolled in a class on digital resources for K-12, a school media methods course. She was interested in "test driving" ideas learned in class with K-12 students and teachers, and as part of the course, the student was required to teach some aspect of information skills to K-12 students. Through her class instructor, the CHICO student was connected with a local middle school sixth grade teacher who had expressed interest in participating in the Ancient Foods project.

The sixth grade teacher had begun by asking her students if anyone was interested in "old things, really old things." From the initial response, twelve students were identified, drawn from several classes. The team member and teacher agreed upon three different project parts which could be explored using Eisenberg's model of the Big Six skills (Eisenberg & Berkowitz, 1990). The CHICO team member helped the

students find sites with information about animals in the ancient world and worked with the sixth graders as fellow researchers. Together they searched the web for appropriate sites from the new Web site that could be used as resources for the project. The learners participated as collaborators on researching the site, and the CHICO team member worked with them on task definition, information seeking strategies, use of information, appropriate citing of sources, organizing the information and putting it together, and evaluation of the information found.

An important activity was creating stories and materials from the information gained in the research process. Once the students had done preliminary Web research about the ancient works (specifically on themes the UM undergraduate class was exploring for the project), they explored ways that information could be used and interpreted by having the students create stories and draw pictures based on their findings. Some of these stories and pictures could then be included in the final Website created for the Ancient Foods projects. The sixth graders are creating clay models of ancient coins containing animal images, and these will be included on the site as an example of student work. The first step involved pencil sketches to be used as guides for the clay models of animals. The team member photographed the art work with a digital camera for inclusion on the site. The sixth graders have also found a number of interesting sites related to animals in the ancient world. They may be included in a resource section for teachers.

The sixth graders will also be providing feedback on the animal site as it develops. A key role for the K-12 learners is evaluating the Website under construction for usability. Learners "test" the new Website while under construction to determine whether it meets their information needs. For the School of Information student, this provides a good opportunity to apply usability assessment skills learned in coursework.

CHICO also arranged a field trip to the Museum for the teacher and students from the local middle school. The group was accompanied by a team member who took photographs for later posting on the Animals Website. The sixth grade teacher helped the team member organize the project activities and made arrangements for a computer lab. The connection with the middle school, the resources for museum education directed to youth, will be useful to the museum as it focuses on becoming more oriented to youth audiences.

Royal Shakespeare Company project

Engagement with K-12 in the RSC project was built on a wide array of activities organized around the event by the University Musical Society and its Education program. The RSC project afforded a number of opportunities for engagement with schools and youth-centered activities. These included

- youth performances
- workshops with K-6 and K-12 teachers
- activities taking place at K-12 schools
- RSC visits with local schools
- workshops for museum curators

Working with these groups, CHICO is gaining feedback on the development of its site, as well as an opportunity to promote the site's existence and to encourage audience participation by submitting essays

and artwork to be included on the site.

CHICO students are developing a word game feature which will allow K-12 learners to interact with the text of Shakespeare's plays and get insight into its meaning. A map feature will allow learners to look at a map of Great Britain and see where the various characters and events in the plays are situated. The interactive map of cities helps visitors to the site explore the theater scene. A participatory feature of the site will encourage audiences to submit their own content, reflecting on their own experiences with the plays, and creating new material -- essays, drawings -- inspired from the plays. Content will be reviewed, edited if necessary, and posted on the site.

Partnership on a Base of Mutual Self Interest

A key factor contributing to the success of generating and sustaining commitment to the partnership is that there be a high degree of mutual self-interest underpinning the participation of each partner. We have found it critical that there be a "win" for each participating party.

Museums

For the participating museums or other content providers, the benefits include

- Rreaching out to a wider audience through digital display of artefacts and increased visibility and access for the collection
- providing a marketing vehicle which sparks interest in the museum's content, promotes the museum's mission and has the potential to build a new user base
- providing contextualization which enhances appreciation of objects, and provides interpretation for their understanding
- providing enhancements to viewing objects, supplementing but not replacing the physical museum visit.

Information Specialists

For students preparing for careers in the information professions and their educators, the benefits include

- real-world experiences which bring together multiple dimensions of information service
- an opportunity to act in a service role
- an opportunity to apply technical skills to humanistic endeavours
- the opportunity to apply a range of information skills: selecting, acquiring, organizing, presenting, and evaluating information
- contact with end-users in museum and K-12 venues
- project-based learning from an interdisciplinary perspective

K-12 communities

For K-12 educators and learners, the benefits include:

- gaining access to a broad array of objects and information in distributed form and thus expanding the base of learning resources

- the opportunity for learners to take what they have seen and have read about an artistic experience and engage in dialog with others
- the opportunity to create their own artistic and information content, building on what they have seen and heard.
- the chance to apply critical thinking skills
- the chance to extend an artistic experience beyond the initial performance or museum visit

Content specialists

For content specialists, the benefits include

- engaging with a broader audience in discussion of their topic
- an opportunity to provide outreach and service
- a chance to think about their topic from a different perspective and share that perspective with others outside the academy or immediate scholarly or specialist community.

Changing Roles

The benefits of partnership will most likely appeal to those who are exemplars of the changing boundaries of their profession. Each type of institution represented by the partners has undergone some degree of change in its mission, and a key part of the value of the partnership can lie in its ability to offer opportunity to test some of the new roles emerging in each of the professions represented.

Information professions

Education for information professions has been undergoing profound changes recently, and at the heart of the changes are the changing roles within the information professions themselves. Librarians, for example, are now recognized increasingly as facilitators of learning and information discovery, as providers of distributed content to users in remote venues, and as practitioners whose skills are of value in a variety of information venues. In addition, the delivery of instruction has changed to provide more project-based, experiential learning. More explicit attention is being paid to long-standing fundamentals of library and information service, with greater emphasis on the end-user. As a result, schools educating library and other information professionals must now provide educational experiences which integrate classroom learning, technology, and practice, deal with real organizational settings, are client-centered, and have a strong service philosophy.

While technology has recently been a driving force in the profession, there is recognition that digital technology is at once an enabling tool which makes different kinds of learning possible, and an object of study itself, with impacts reaching into almost every branch of human experience. Students of the information professions gain not only from assisting many different types of clients in the use of information and information technology, but also from observing the impacts of information and information technology on environments such as museums and K-12 classes (Frost, 1998).

While technical challenges are daunting, more challenging still are the human challenges brought about by information technology. Students

need to become acquainted with issues such as technology acceptance, intellectual property, and information access. The project-based experiences working with museum and K-12 clients can provide excellent examples of these issues.

In addition, projects with an arts and technology connection are effective in attracting students who have learned technical skills and want to apply them to interesting problems. Added to this is the opportunity to provide a real service with a human dimension. These projects have attracted students across the spectrum of our curriculum, from archivists, librarians, and information policy specialists to human-factors and usability experts and e-commerce specialists.

When invited to participate in the Royal Shakespeare project, one student exclaimed,

> I'm so eager to work on this project! In addition to being a chronic Anglophile, I would feel honored to contribute to a website that will provide such a valuable service to the community. What makes my skill set especially applicable to this project is diversity. Usually one finds programming proficiency in one person, creative/graphic ability in another person, and writing skills in a third. My background, however, includes all of the above.

Museums

Museum professionals also find themselves at a time of change, with changes in their professional missions, an expansion of their target audience, and new options for delivery of their content. Many museum staff have not grown up with computers, but now find that technology has the potential to fundamentally change the way in which museum content is delivered. At the present time, web surfers can visit over five thousand online museum sites (Davis, 2000), and for many, the digital experience may become the primary way a visitor comes into contact with a museum exhibit. At the same time, the digital experience differs in many fundamental ways from the experience of the original, and this difference can vary with adult viewers (Taylor, 2000) and younger viewers (Thompson, 1982).

While it is obvious that the images seen by viewers on their computer screens will vary in significant ways from those seen by viewers in their visits to museums, perhaps less apparent is the way in which different digital representations can also vary, depending on method of image compression, screen resolution, and the like. Visitors scanning a screenful of thumbnail images or pursuing a series of hyperlinked images will browse the collection differently from those who are visiting the physical collection in a sequential way (Frost, 2000). And of course the experience of walking through a museum exhibit provides a whole array of sensory effects of smell, sound, touch and institutional aura which can at best be found in a computer experience in only a limited and experimental way (Greenman, 2000). Added to this mix of questions is the social dimension of museum viewing and its related impacts on individual and group experiences both within and outside the museum (Chadwick, 1992, 1999, Falk & Dierking, 1992). With the potential for interactive communication, will museums be able to engage audiences in new ways? What is the role for computers within museums? What are the curators' roles in interpreting museum content, and how are these

roles now being shared with educators? (Roberts, 1997)

Similar to "talk-back" areas in a museum, where visitors can post comments and questions about an exhibit, the Web offers opportunity, for example through a Web-board, for visitors to respond to what they have seen and to have questions answered by museum staff. How does this new form of interaction affect the viewer's experience and relationship with the museum?

All of these new and interesting questions will require that museums have direct experience in offering their collections in digital form, in providing complementary and interconnected experiences, and in giving viewers an opportunity to interact with both physical and online forms of the exhibit. This will help museums address questions such as the role of physical and virtual objects, and whether the virtual medium will serve to promote or deter visits to the physical collection. How can the virtual exhibit promote the afterlife of an exhibit, and how can it help users become more informed before visiting the museum?

At the same time that the technology revolution has been changing museum practice, there has also been a change among many museums in their core mission. Whereas the mission used to be to solely to collect, preserve and exhibit works of art, that mission has now expanded to include education and outreach to new audiences, especially for youth and populations which have been historically under-served. Museum professionals' roles have expanded from curators and directors to include educators, marketing officers, and technology specialists. Educators may be more closely involved in the planning of an exhibition. New vehicles exist for displaying or enhancing the exhibits to include video, audio guides, games, printed guides, CD ROMs, and Websites.

Content specialists

For the scholar, faculty member or other content specialist, there is the opportunity to expand the reach for the topic of research, to provide opportunity for engagement with new audiences, and to provide an outreach service to the community. It gives an opportunity to bring together the three key missions of teaching, research, and service. It gives the scholar a chance for interdisciplinary engagement with content specialists in related areas. It also allows the faculty member, along with the students, to explore new means of knowledge work using digital technologies. While this type of involvement is not typical for faculty members, developing on-line resources gives interested faculty an opportunity to expand their roles as universities begin to place greater emphasis on interdisciplinarity, outreach, and the integration of service into teaching and research.

K-12

Several decades ago, Dewey pointed out the importance of experience in helping give meaning to abstract concepts and saw a special place for museums and objects in education (Dewey, 1938), ideas which still remain a force in contemporary K-12 museum education activities (Hein,1998). With the appearance of Web-based museums and the ability of access to primary resources and background materials, these concepts take on new significance. In addition, new opportunities are afforded for learners to interact with content and with other interested

learners, and to create and make sense of their own content.

Previous Projects Exemplifying the Model

The Ancient Foods/Animals and the Royal Shakespeare Projects build upon a base of pilot activities which were examples of similar collaborations with museums, K-12, information specialists, and content specialists.

CHICO team members worked with museum curators to develop a Website called Mummies of Ancient Egypt. This resource is aimed at K-12 students studying ancient Egyptian culture and is intended to complement visits to local archaeological collections. (http://www.si.umich.edu/CHICO/mummy/). While we did not directly involve K-12 communities in the development of the projects, the site has generated years of correspondence from K-12 teachers and learners offering feedback.

"Harlem 1900-1940: An African-American Community" is a collaboration between CHICO and the Schomburg Center for Research in Black Culture at the New York Public Library. The Schomburg asked CHICO to provide an online virtual exhibit of one of its most popular collections, a photographic portfolio depicting the Harlem Renaissance. At the core of the exhibit is an online presentation of the Schomburg's compelling portfolio, "Harlem 1900-1940," featuring more than 30 archival photographs. A section for educators, with lesson plans and discussion guides, is aimed at K-12 teachers and learners. (http://www.si.umich.edu/CHICO/Harlem/) A similar partnership with the Schomburg resulted in the creation of a site called The African Presence in the Americas (http://www.si.umich.edu/CHICO/Schomburg/).

In partnership with the Smithsonian's National Museum of the American Indian (NMAI), CHICO team members helped transform a site-specific exhibit into an interactive, multimedia resource available to global audiences. CHICO staff developed the exhibit based on content developed by Alaskan Native American Yup'ik Elders, with an NMAI exhibit curator (http://www.si.umich.edu/CHICO/Yupik). Building on this resource, a faculty member and graduate student in the University of Michigan School of Education developed an interactive educational resource with content provided by Yup'ik students and educators. Yup'ik elders also worked with CHICO staff to transform the online exhibit into a CD ROM featuring additional oral histories and audio resources.

CHICO and the UM Museum of Art (UMMA) joined forces in a collaborative project with local middle-school students, art and technology teachers, the museum director of UMMA, and the outreach coordinator of CHICO to collectively enhance the learning process through an experimental elective course. In the Stylistic Journey Project, CHICO developed a Webboard which was used extensively to facilitate online discussions among teachers, curators and students (http://www.si.umich.edu/CHICO/Emerson/).

In a CHICO partnership with the University of Michigan Museum of Art and a local school, a set of fifth graders from a local school were engaged in developing an exhibit guide which would reflect their perspective but also have its content reviewed and validated by UMMA curators. Together with the UMMA museum professionals, the students, their art teacher and the school's technology specialist, CHICO helped

create "Monet at Vetheuil", an online, interactive exhibit guide. Youngsters were able to research specific artistic resources and painting techniques in consultation with curatorial experts, and to create their own works of art based on their experiences and learning. A bulletin board and online quiz facilitated communication among students, educators and the exhibit curator, and welcomed responses from a global audience (http://www.si.umich.edu/CHICO/monet).

Lessons Learned

In the course of implementing and evaluating the projects, a number of recurring themes and issues have surfaced to assist us in future development of similar sites.

Intellectual Property issues

Since copyright takes on new dimensions in the digital world, many of the assumptions to which we had become accustomed are changed or no longer valid; many old assumptions are challenged. One example is the ownership of items in the collection of a museum or archive and our ability to use them in collections. For example, if a museum educator wants to create a site for teachers in which she uses images from her local museum, and if that museum "owns" all the material in its collections, and with it all donated items, does that mean that the museum is free to make images of these items universally available through the Internet? Although a museum or other repository may "own" a photograph, painting or statues, and may have been given the right by the donor to display that object in the collection, that does not necessarily entitle the institution to post images of the item on the Web. Instead, such "ownership" conditions needed to be re-negotiated, and securing permission to use digital objects may involve going beyond their original "owner."

In addition, we found it critical that agreements be worked out in advance and in writing indicating the ownership and disposition of the intellectual property of the content provider, as well as how the project team may use or distribute the content in the course of the project work.

Rules of disengagement

The CHICO projects have as one of their main goals the provision of educational experiences for information students. While the development of Websites is a key means of providing these experiences, the project is not serving primarily as a production unit, and decisions must be made in a way which balances the educational needs of the students with the needs of the project partners. Staff change each year, with new students entering, graduating, or moving on to other projects. Staff skill levels vary. Accordingly, decisions must be made as to when to move a site to the CHICO archives (and notify viewers that the site is no longer being actively maintained), when to continue maintenance and upgrading, and when to remove a site outright. Ideally, a site would be handed off to the participating project partner for maintenance, but this is not always feasible. If a site is to be continued, how can it be kept active and fresh while new projects are developed? This can be a key problem since student participation is voluntary. Students are more likely to be attracted to the development of a new site in which they have a stake, and for which they can take credit and can cite in their job search portfolio.

Coordinating schedules and goals

University course projects need to be coordinated within the framework of the academic term or semester, but in real life, project activity does not always fit neatly within this timeframe. Project expectations and deliverables need to be managed within these constraints, without penalizing students for difficulties beyond their control. Difficulties in coordinating meetings are to be expected, and this can cause a lag in project work, yet the students expect to be actively involved in a project in the course of a term. If the project experiences a serious delay, the students are encouraged to try to fill in this time with project activities within their control (e.g., developing background information, locating information resources, or preparing draft proposals of work for reaction from the project partners). If the student teams experience a major setback, the project goals need to be adjusted, and in the unlikely event that the problem is not correctable, the students are encouraged to focus instead on an evaluation and assessment, with recommendations based on lessons learned.

Matching skill levels with project needs

The projects are designed to allow student participation at various skill levels. Projects start off by doing a skills inventory to determine what skills students have and need. Students are then pointed to resources, on campus and elsewhere, that can assist them in gaining new skills. Students are paired with experienced team members, and novices of one year become seasoned trainers in their second year. Where possible, projects are matched with skill level and interest. SI students generally have a variety of backgrounds, with both content and technical expertise reflected in the team membership at any given time.

Conclusion

This paper has described a model for community partnerships involving information specialists in training, museums and other content providers, content specialists, and K-12 teachers and learners. The focus has been on two recent activities involving partnerships with museums, libraries, and a performing arts group. The experiences have provided a valuable opportunity for information specialists, museum curators, and K-12 educators to gain insight into new roles in their changing professions.

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